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UNITED STATES NAVY

MEDICAL NEWS LETTER

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Evaluation of Steroid Treatment of Asthma Since 1950

Horace S. Baldwin MD, Murray Dworetzky MD, and Norman J. Isaacs MD, New York Hospital-Cornell Medical Center, New York, N. Y. J Allergy 32: 109-118, March - April 1961.

Use of corticosteroids in asthma presents problems unique to the disease and peculiarly related to current questions as to the dangers of steroid therapy. In the first place asthma in a high percentage of patients is reversible when the sum total of stimuli to the asthmatic state are studied and treated. Also, in intractable cases chronic infection in the respiratory tract is so common that steroid treatment carries with it the dangerous possibility of lowering the patient's resistance to infection and masking development of acute intercurrent infection, especially pneumonitis. Therefore, the physician, when starting an asthmatic patient on steroid therapy, should be sure of the thoroughness of his analysis of the patient's asthmatic factors so that if steroid therapy is instituted, the dosage will be at the minimum effective amount. At all times, the hazards of steroid therapy should be kept in mind, but with the added precaution to be alert to the problems of respiratory infections that are so common in the asthmatic patient.

The present paper is based on a study of 48 patients with continuous intractable asthma and 39 patients with intermittent severe asthma in whom corticosteroids have been used. The investigation began in 1950 when cortisone was first used in The New York Hospital as an adjunct in treatment of asthma and includes experience with the various steroid compounds.

General Conditions of Patients. Allergic factors were found in 39 patients of the Continuous (C) group (81%) and 34 patients of the Intermittent (I) group (85%). Infectious factors comprised infection in nasal sinuses, pharyngeal lymphoid tissue, and in the lungs and bronchi. In the C-group, 41 patients (85%) had evidence of infectious factors as compared with 24 (61%) in the I-group. Psychosomatic factors precipitating or augmenting the asthmatic reactions were evaluated in all patients, but it is difficult to state with certainty whether these factors were secondary to the chronic asthma problem or were initiating factors. Psychosomatic factors were considered important in contributing to the asthma in 22 patients (45%) of the C-group compared with 7 patients (18%) in the I-group. Irreversible structural changes involving the pulmonary-cardiac system and indicating chronic pulmonary fibrosis and emphysema were determined by physical examination, respiratory function tests, and x-ray examination. Structural changes of this sort were found in 24 patients (50%) of the C-group compared with 5 patients (15%) in the I-group.

Duration of Steroid Treatment. Continuous steroid therapy has been maintained in 48 patients ranging from one to nine years duration (average 4.4 years). In the I-group of 39 patients, treatment has ranged from a few days to a maximum of 210 days, with an average of 40 days duration. In this group a total of 84 courses of steroid therapy has been given to the 39 patients.

Steroids Used. Many patients in both groups received several of the various steroids to evaluate comparative clinical effect and dosage. Since it became apparent early in the study that prednisone had distinct advantages over cortisone and hydrocortisone in causing less sodium retention and potassium excretion, these were discontinued from further use. The largest number received prednisone because it was available earlier than 6-methyl prednisolone, triamcinolone, and dexamethasone.

In general, the average daily maintenance dosage of steroid falls into the rated milligram conversion dosage of one steroid to another. However, there was a wide range of daily dosage necessary to secure satisfactory clinical results since certain patients under the stress of increased precipitating factors required heavier dosage; whereas, at times, when a minimum of such factors was operating, only a small maintenance dose was required.

Complications and Side Effects. It is important to emphasize that steroid compounds can produce profound metabolic effects and that serious complications have been reported with their use. One patient with diabetes required larger insulin dosage and more rigid adherence to diet. One patient lost considerable weight and had muscle wasting after several months treatment with triamcinolone. He quickly gained his normal weight and muscular development after being shifted to prednisone. One patient receiving dexamethasone developed purpuric spots. Cushing facies, mild edema, hirsutism, pronounced appetite, acne, palpitation, insomnia, and weakness have occurred in several patients but soon disappeared when the amount of steroid was adjusted or another compound was substituted. The incidence and extent of osteoporosis are difficult to evaluate but no fractures have occurred. None of the other commonly reported complications developed.

In general, fewer side effects have been noted in patients taking prednisone and 6-methyl prednisolone than with triamcinolone and dexamethasone. In all cases the dosage of steroid has been cut to the minimum effective amount as soon as possible and this, in the great majority of cases, has been small. This fact probably explains the few complications and side effects of steroid therapy that have occurred in this series.

Mortality. In this series of 87 patients, 6 have died; in none was there an obvious connection between death and steroid medication with one exception—one patient died after withdrawal of all steroid medication while away from our supervision.

Failure of Steroid Therapy. Failure of steroid therapy to produce symptomatic relief of the asthma has been observed in 8 patients. In 7 patients, inability to clear up infectious foci in the respiratory tract and irreversible structural changes in the lungs have appeared to be the reason for failure. In one patient, failure of steroid therapy was attributed to poor cooperation and strong psychologic factors.

Surgical Complications. One of the most important complications of steroid therapy is the danger of adrenal failure accompanying operation. In this series we have carefully followed the usual precautions and given supplementary steroids before and after operation and have had no complications of this sort.

Need for Hospitalization. In C-group, 28 patients (58%) required one to 7 hospitalizations prior to steroid therapy. After use of steroids, 16 of the 28 required one to 4 additional hospitalizations. Only one patient who was not hospitalized prior to use of steroids subsequently required hospitalization.

In I-group, 5 patients (13%) required hospitalization before steroids; subsequently none has required hospital care.

Specific and Ancillary Management. The importance of conventional, standard management of the asthmatic patient under steroid therapy cannot be overemphasized. Indeed, the C-group consisted of those patients in whom all other forms of conventional therapy—including specific management (consisting of elimination of allergens and immunization) and nonspecific management (including bronchodilators, expectorants, antimicrobials, and nasal surgery where indicated)—had failed to give relief. The patients in I-group were those, for the most part, in whom attacks of acute asthma were due either to infection or exposure to allergens, often complicated by psychogenic factors. In these patients, steroids were used to control the acute episodes until such time as conventional therapy was adequate to maintain relief of symptoms.

It is interesting to note that antimicrobial therapy was employed at one time or another with about the same frequency as specific therapy. Antimicrobials were used many times in most patients whenever there was clinical or laboratory evidence of respiratory infection and approximately the same proportion of patients in the C-group and I-group received antimicrobial therapy throughout the period of study.

Nasal surgery for eliminating foci of infection or promoting better aeration and drainage was performed in a total of 26 of the 48 patients in C-group and in 12 of the 39 patients in I-group.

Examination of data on specific and ancillary management before and after steroid therapy makes it apparent that steroid treatment did not eliminate the necessity of standard, conventional management. Unless the required ancillary measures are continued, larger doses of steroids are necessary, thereby increasing their hazards.

Discussion. One of the most important questions involved in steroid treatment of the patient with asthma is whether initiation of steroids means permanent reliance on those drugs with an increase in dosage as time goes on. Evaluation of I-group indicates that there are numerous patients in whom steroid therapy can be limited to short-term periods until the asthmatic factors are controlled; at this time, steroid therapy can be terminated. In C-group—which comprises those patients with intractable asthma usually with multiple asthmatic factors consisting of allergic stimuli, chronic respiratory infection, psychosomatic tendencies, and structural changes—it would seem from our experience that if a few conditions could be met the daily minimum effective dose of steroids could be gradually reduced and, at times, eliminated altogether. These conditions include cooperation of the patient toward elimination of, and immunization to, allergic factors, control of chronic respiratory infection by elimination of foci of infection by suitable operation and use of antibiotics, evidence that structural changes in the pulmonary and cardiac areas have not progressed

too far, and success in gradual reduction of the daily minimum effective dose of steroids. The psychologic factors which play such an important part in precipitating and augmenting the asthmatic state are often relieved when, through effective use of steroids, the asthmatic patient is able to resume his job or pursue her usual domestic duties with elimination of the insecurity attached to constant asthma.

In reviewing this series of patients, we have been continually impressed with the importance and frequency of respiratory infection. One of the great problems of steroid therapy consists in its effect on infection and the possibility that it may suppress the protective inflammatory response and thus favor development of subclinical infection into active infection. Antibiotics are of value in these cases, but the alert physician must be aware of the dangerous effects of antibiotics in developing resistant strains of bacteria—especially the Staphylococcus—and the possibility of overcoming bacterial infection, but favoring the development of pseudomonal and fungal infections. At present, it would appear that the effects of steroids and antibiotics in treatment of viral infections have not been definitely established.

Finally, we would emphasize that the great majority of patients with asthma need never take steroids if they are properly diagnosed and treated specifically, and with the conventional ancillary drugs.

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The Kveim Test in Sarcoidosis

Louis E. Siltzbach MD, The Mount Sinai Hospital, New York, N. Y. Editorial, Amer J Med 30: 495-501, April 1961.

The cloud of uncertainty about the validity of the Kveim test in diagnosis of sarcoidosis seems to be lifting gradually. For some 20 years, favorable experiences with this diagnostic procedure have been accumulating in this country and abroad. With preparations of satisfactory specificity and sensitivity, it has generally been found that about 3 of every 4 patients with active sarcoidosis respond. In them, a papule is induced at the site of injection which, on punch biopsy performed under local anesthesia 4 to 6 weeks after injection, shows epithelioid-cell tubercles similar to those seen in spontaneously occurring lesions. "False-positive" reactions are uncommon—being exhibited by about 2% of nonsarcoid subjects—when the test is properly performed. Unfavorable opinions about the worth of the test may have stemmed, in part, from use of unsuitable test preparations.

An International Conference on Sarcoidosis took place in 1960 under the auspices of the National Academy of Sciences—National Research Council. The conference formulated a summary statement describing the characteristics of sarcoidosis which took cognizance of the usefulness of the Kveim test as a histologic means of confirming the diagnosis of sarcoidosis: "The diagnosis should be restricted to patients who have consistent clinical and radiologic

features together with biopsy evidence of epithelioid tubercles or a positive Kveim test."

The Kveim test serves two main diagnostic purposes. First, it confirms the diagnosis of sarcoidosis in patients for whom we have clinical but not histologic data. Second, it helps to differentiate between sarcoidosis and other granulomatous diseases when characteristic epithelioid-cell tubercles are found in the tissues by biopsy, but clinical ambiguities exist. Here, a positive reaction to the Kveim test can be decisive. Availability of effective Kveim test suspensions would increase awareness of and interest in sarcoidosis and make for earlier recognition.

When early asymptomatic hilar node enlargement is disclosed by mass roentgenography, the suspicion of sarcoidosis immediately comes to the fore. Such patients, however, cannot be assigned a definitive diagnosis until histologic corroboration can be obtained. Pre-scalene fat pad biopsy affords a corroboration in perhaps half of these cases since the tiny lymph nodes in the fat pad communicate with the mediastinal nodes and may contain the epithelioid tubercles quite early in the course. Negative histoplasmin and negative or weak tuberculin tests under these circumstances give additional support to the diagnosis of sarcoidosis.

Ninety percent of patients with freshly discovered hilar node enlargement due to sarcoidosis respond to the Kveim test. In approximately 50% of early cases in which no histologic data can be obtained, the Kveim test can often be determinative. When diagnosis becomes definite only with appearance of enlarged peripheral lymph nodes or of cutaneous lesions which can be biopsied, the delay in time results in inclusion within the diagnosed group of a higher proportion of patients in the later stages of the disease, thus weighting any sample. Such delays also distort the prognosis which becomes more favorable as earlier cases are introduced.

Obviously, the Kveim test cannot be used in the manner in which intracutaneous tuberculin or histoplasmin are applied as mass-screening test agents. Obligatory biopsy of the test site makes the test unsuitable for case-finding in the general population. For this purpose, a specific serologic test for sarcoidosis would be a great boon.

The mechanism for production of the specific papule in a positive Kveim test is not understood. Perhaps the reaction represents a long delayed specific allergic response; but, support for this hypothesis is yet to come. Nor do we know the nature or cellular location in sarcoidal tissue of the active principle responsible for the positive Kveim reaction. However, what gives the Kveim test its special value is its high specificity in contrast to the nonspecific appearance of the spontaneous granuloma of sarcoidosis.

The epidemiologist finds a perplexing problem in sarcoidosis. Its spotty distribution from country to country and also from section to section within any one country is still to be explained. Patients exhibiting sarcoidosis can be discovered in almost every country if there is an alertness to the possibility.

It is not known whether the frequency of sarcoidosis is generally increasing. In Sweden, where full data have been available on an annual basis

since 1950, the incidence of sarcoidosis has been relatively constant in the face of a precipitous fall in the new case rate for tuberculosis. In other countries with lower sarcoidosis rates, the steady fall in tuberculosis morbidity and mortality may bring to light hitherto unsuspected instances of sarcoidosis—provided mass roentgenography is practiced. With a clear definition of sarcoidosis and its characteristics and with use of improved diagnostic agents, we may now expect a truer picture of the epidemiology of the disorder to emerge. Further exploration of ecologic factors also should become more meaningful.

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Technics of Intramuscular Injection

Samuel Zelman MD, Veterans Administration Hospital, Topeka, Kans. Notes on Techniques of Intramuscular Injection: The Avoidance of Needless Pain and Morbidity. Amer J Med Sci 241:563-574, May 1961.

Intramuscular injections, like many other technical procedures, were originally administered by physicians, but have largely been taken over by the nursing profession. This is as it should be, for the physician would be greatly limited in his effectiveness if he were required to administer these himself. Being no longer familiar with the technical details of the intramuscular injection, physicians may be inclined to treat them perfunctorily. Such an attitude innocently acquired by nurses may lead to improper practices of that technic with resulting unnecessary pain and morbidity to patients. Patients may not complain of the pain inflicted for they tend to assume such suffering to be a necessary part of the procedure.

Prior to introduction in 1945 of penicillin therapy, physicians were well taught and practiced in the technic of IM injection by virtue of their experience in syphilis clinics. Injection of irritant bismuth or mercury salts required a meticulous technic to avoid disaster. It is surprising how scant are descriptions of injection technic in textbooks of nursing.

Technic of Injection

Size of Needle. The needle should be long enough to reach well into the belly of the muscle. Otherwise there is danger of injection into deep subcutaneous tissue. Many medications require IM injection solely because of the greater pain caused by them if injected subcutaneously, due to greater subcutaneous sensory innervation. Other medications are injected IM because of the need for more rapid absorption. Slower absorption in the subcutaneous tissue not only defeats the requirement of more rapid systemic effect, but also allows greater tissue reaction to the irritant qualities of the longer persisting medication, leading to persistent painful encapsulated nodules or "sterile abscesses."

A needle of one inch length is never adequate in any but emaciated adults, while a needle of 3 or even 4 inches length may be required in a very

obese person. Usually, a needle of 1-1/2, 2, or 2-1/2 inches length will suffice. (The gauge of the needle should be reasonably small, consistent with the viscosity of the injection material. —Editor)

Introduction of the Needle. The important point in introducing the needle is the maneuver of retracting the skin and subcutaneous tissues. Theoretically, when the needle is later withdrawn the return of these superficial tissues to their normal positions serves to break the direct needle track, thus decreasing the likelihood or quantity of subcutaneous seepage of injected material from within the muscle belly. A more important function, perhaps, is served by the tactile knowledge thus gained of the approximate location in depth of the firmer muscular tissue underlying the movable subcutaneous mass.

Aspiration. This maneuver is designed to test for accidental entry of the needle into a blood vessel, and is necessary to avoid intravenous or intra-arterial instead of IM injection. Aspiration should continue for 5 to 10 seconds, particularly with narrow gauge needles. If blood, or any other fluid, is obtained, the needle is withdrawn and another injection site chosen.

Injection. A slow rate of injection allows time for distention of an accommodating space within the muscle, sparing the patient the pain sensations of the pressure-sensitive nerves within the muscular tissue. In gluteal injections, more frequent even than a hasty rate of injection in causing unnecessary pain is failure to have the patient "toe in" to relax the gluteal muscle. A contracted muscle cannot receive the IM injection without marked increase in pressure, producing both pressure pain within the muscle and painful subcutaneous leakage outside the muscle.

A bubble of air in the syringe barrel held upright provides the means for clearing the needle of medication before withdrawal, thus reducing the dripping trail of medication through the subcutaneous tissues on withdrawing the needle.

Massage. Deep firm massage of the muscle tissue favors spread of the medication through a wider area of tissue, increasing the area of absorption and decreasing the intensity of discomfort. Massage should be performed with the muscle relaxed, for massage of a contracted muscle may increase subcutaneous leakage.

Posterior Gluteal Site

The upper outer quadrant of the buttock is the site of choice in the traditional method of IM injection. This quadrant allows a maximal thickness of muscle to receive the injected material, so that it may be deeply injected. It avoids the blood vessels and nerves which are present in profusion in the upper inner quadrant, and the great sciatic nerve in the lower inner quadrant. No other quadrant of the buttock is acceptable. Injections into the deltoid or other muscles are less satisfactory because of the thinness and greater sensitivity of these muscles and the proximity of vulnerable nerves.

The greatest hazard to which the IM injection into the buttock is subject is injection into or near the sciatic nerve in the lower inner quadrant. It has

been found that injection into the lower central portion of the buttock endangers the greater sciatic nerve if the injection extends through the gluteus maximus muscle. The more common and temporary sciatic-like pain extending down the back of the thigh is attributed to irritation of the small sciatic nerve which lies immediately over the great sciatic nerve in this area.

Injection into the upper outer quadrant of the buttock should be given with the patient in the prone position, toes facing inward and heels outward. This latter position causes gluteal muscle relaxation, automatically maintained by the patient. Standing or sitting positions have been described but add increased hazards. The patient may make a sudden jerking movement at the time of painful entry of the needle. In this position, muscle relaxation may not be achieved.

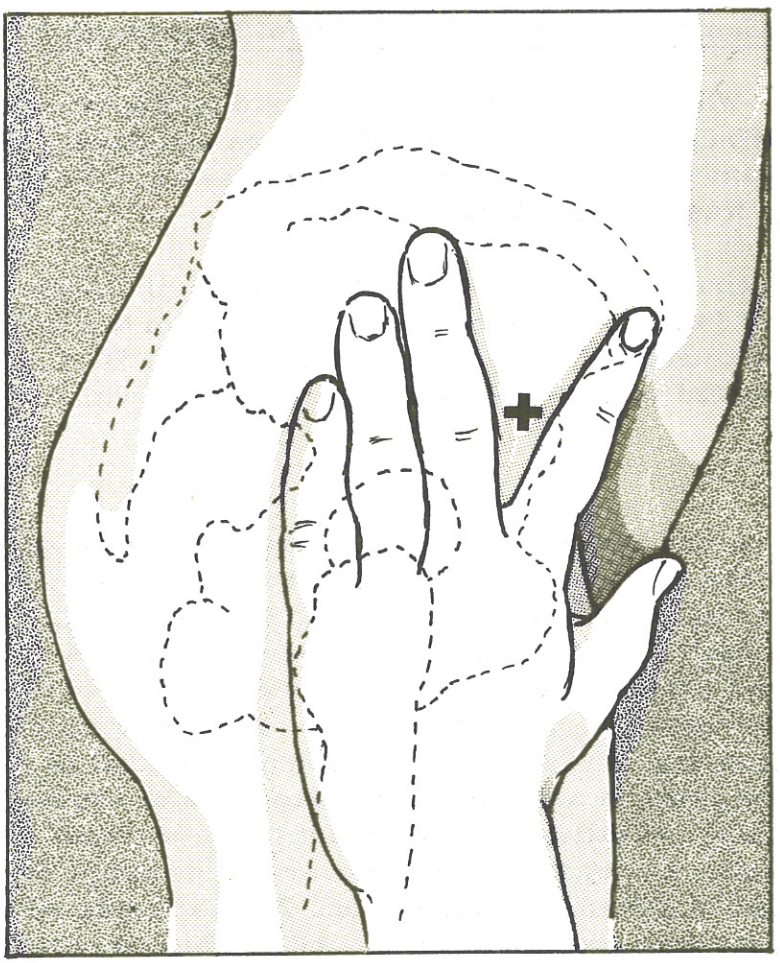
Anterior Gluteal Site

A simpler and safer method of IM injection has become available with introduction in 1954 by von Hochstetter of a new area of choice for IM injection, the anterior gluteal region.

The anterior gluteal region actually provides a greater thickness of gluteal muscle into which to inject consisting of the gluteus medius and minimus muscles. No significant penetrating nerves or blood vessels are found in this area which is served by multiple small nerve and blood vessel branches. At its depth, it is sealed off by bone from underlying vital structures. The direction of the muscle bundles is such as to prevent a run-off of injected material toward the sciatic nerve, in contrast to the gluteus maximus muscle bundles of the posterior injection site. The layer of subcutaneous fat in the anterior gluteal region is always thinner than that over the posterior buttock, thus reducing the hazard of subcutaneous deposit of medication by short needles. Furthermore, the subcutaneous tissue is looser here, allowing its thickness easily to be determined by raising a skin fold. It is a cleaner area, freer of fecal organisms on the skin surface. It can be readily localized by palpation of available bony markings by simple maneuvers. It can be used in any body position and is especially suitable for use in patients lying on their backs.

The anterior gluteal injection site is readily localized by palpation, as shown in the figure. Either anterior superior iliac spine is identified, and the tip of the index finger of the opposite hand of the operator is rested on it. The adjacent third finger is widely abducted (to form a V with the index finger) and its fingertip finds the crest of the ilium in order to slide just below it and rest there. As the palm of the hand then rests on the lateral aspect of the anterior pelvic region, the site of injection is unmistakably outlined by the confines of the triangle formed by the V of the two fingers and the horizontal ridge of the iliac crest above. A right handed person injecting into the patient's left side will reverse the positions of the two fingers of the left hand, placing the third finger on the anterior superior iliac spine and the index finger just below the iliac crest laterally. In very obese patients it may be necessary to lift the abdominal panniculus upward and medially away from the injection site; this

is easily done by the patient or an assistant. The needle is thrust through skin and muscle in a single movement, pointing slightly caudally, to a depth of 3 to 4 cm (1 to 1-1/2 inches), and the medication injected slowly after first aspirating for the rare possibility of having entered a blood vessel. If the needle should be pointed too far cephalad, it is apt to encounter bone in which event the needle is withdrawn partially before injecting. The technic is simple and easily learned.



Following introduction of this technic on the wards of this hospital, nurses quickly became enthusiastic over its advantages in not having to turn patients and in the marked reduction in the number of details of technic required by the posterior gluteal injection. With increased experience they noted absence of sequelae in the form of painful subcutaneous indurations, patients' discomfort in lying on their injected buttocks, and tingling nerve injuries involving the legs.

In nearly 2 years of experience with this method, we have encountered no morbidity. Pain is about the same as in posterior gluteal injections though

painful sequelae are not seen. Patients who are ambulatory sometimes complain of greater pain on walking than they had experienced after posterior gluteal injections. On the other hand, bedfast patients have had none of the pain previously complained of when lying on their injected buttocks. Our experience leads us to believe that this technic of IM injection, if not ideal, is the best available.

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Comparative Nuclear Effects of Biomedical Interest

Clayton S. White, I. Gerald Bowen, Donald R. Richmond, Robert L. Corsbie, Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex., and U. S. Atomic Energy Commission, Division of Biology and Medicine, Washington, D. C.

NOTE: This report, identified as CEX-58.8, Civil Effects Study, with an issuance date of January 12, 1961, is available from the Office of Technical Services, Department of Commerce, Washington 25, D. C., at $1.00 per copy. The digest presented here is of only that portion dealing with Biologic Parameters.

Abstract

Selected physical and biologic data bearing upon the environmental variations created by nuclear explosions are presented in simplified form. Emphasis is placed upon the "early" consequences of exposure to blast, thermal radiation, and ionizing radiation to elucidate the comparative ranges of the major effects as they vary with explosive yield and as they contribute to the total hazard to man. A section containing brief definitions of the terminology employed is followed by a section that utilizes text and tabular material to set forth events that follow nuclear explosions and the varied responses of exposed physical and biologic materials. Finally, selected quantitative weapons-effects data in graphic and tabular form are presented over a wide range of explosive yields to show the relative distances from Ground Zero affected by significant levels of blast overpressures, thermal fluxes, and initial and residual penetrating ionizing radiations. However, only the "early" rather than the "late" effects of the latter are considered.

Advent of nuclear weapons and their integration into programs vital to national defense emphasize the need for broad public knowledge of nuclear effects. Also, increasing employment of nuclear materials in an expanding variety of peaceful applications serves notice that the public must learn to live in a nuclear age. Regardless of whether the future holds continued peace or the necessity of surviving a national emergency involving nuclear war, each individual citizen should share with the Government the responsibility of providing sensible

levels of protection against nuclear effects. The purpose of this publication is to provide citizens and Government alike with a single simplified source of information about nuclear weapons and related biologic data which deals in a comparative way with effects due to blast and to thermal and ionizing radiations. Such data will help the average man assess for himself the risks he and his family face in the nuclear era and will provide background information for decisions and action regarding protective construction.

Blast Effects

Primary (Pressure) Effects. It is now known that the tolerance of mammals (if the eardrums and sinuses are ignored) to variations in environmental pressure depends a great deal on maximal overpressure (definition: the transient pressure variation above the ambient produced by an explosion; it travels radially from the source of the detonation), rate of pressure development (time to P_{max}), character of the rising (and under certain circumstances the falling) portions of the pressure curve, and duration of the overpressure. In general, biologic tolerance to long-duration overpressures going to P_{max} instantaneously, ("long" and "instantaneously" being used relatively), as occurs when a shock wave accompanies the advancing pressure pulse, is a function mostly of the overpressure. In contrast, for short-duration fast-rising pulses, the duration as well as the magnitude of the overpressure is critical, e.g., the shorter the duration, the greater the overpressure required to produce a given level of damage. The interval over which variation in the duration is significant apparently depends upon the size of the animal and is not known with certainty for each species. However, the definitive values for duration are like hundreds of microseconds to a few milliseconds for smaller animals and many to a few tens of milliseconds for the larger animals.

Damaging and fatal conditions for man are not clearly defined. However, tentative estimates for carefully delineated conditions can be set forth based on animal experiments and on a few instances of human exposure.

Secondary (Missile) Effects. The impact-velocity relationships for glass fragments to pass through the body wall of dogs and reach the abdominal cavity are shown in tables; also, tables give the threshold for penetrating wounds and skeletal fracture determined with bullets, using human material. The potential hazard of damage to the globe of the eye is described in detail because such wounds require expert medical attention to control infection and avoid loss of sight.

Some appreciation of the biologic effects of nonpenetrating missiles can be obtained by consulting other tables, some of which give data regarding chest damage in dogs from the impact of missiles against the thoracic wall and the range of impact velocities over which human skull fracture can be anticipated if the head were struck with an object weighing about 10 lbs (near the average weight of the human head).

Tertiary (Displacement) Effects. It is likely that most injuries associated with displacement by blast winds will occur during decelerative impact

with some hard object. Although the impact velocities are low for severe injury to humans when deceleration is abrupt and occurs over a very short distance, survival of man from falls involving 80 to 90 mph velocities has been described when the deceleration was less rapid and occurred over distances of several inches.

Thermal Effects

Skin Burns. Thermal energies required to burn exposed human skin are related to explosive yield. A given amount of energy, if applied quickly, produces a more severe burn than the same energy applied slowly. A consequence of this is the fact that the energy required to produce burns of the same severity is greater for the larger than the smaller yield explosions since the former apply energy more slowly.

Extent of Burn and Mortality. It is instructive to note that mortality in burn cases, on the average, varies with the extent of the total area of the body affected. Shown on tables, 50% mortality was, on the average, associated with a burn involving 65% of the total body area. Roughly 50% of properly treated individuals will survive a second-degree and third-degree burn involving nearly 85 and 46% of the total body area, respectively.

Healing Time of Experimental Burns. The healing time of small experimental burns in humans has been reported to involve times like 8, 16, and 25 days for first-, second-, and third-degree burns, respectively, provided infection did not occur. Since second- and third-degree burns for all practical purposes will involve infection, early therapy is essential. Clean second-degree burns usually heal by epithelization, but if infection ensues, healing may take up to 6 weeks. Very small third-degree burns heal by scar formation, but if the burn is more than 2 cm across, skin grafting is usually essential. Extensive third-degree burns require prolonged plastic repair involving hospitalization for many months.

Flash Blindness. It has been stated that temporary loss of vision can be expected as far away as 35 miles from the night detonation of a 20-kt nuclear device.

Retinal Burns. Retinal burns, according to one source, can occur as far away as 35 miles from a 20-kt nuclear detonation in clear weather. There is more of a hazard at night because the pupil is dilated. Appreciation of the hazard to man from retinal burns resulting from fireball light is apparently far from complete, particularly for bursts above or in the high terrestrial atmosphere. However, it has been concluded that an individual would have to be looking directly at the fireball of a nuclear detonation to receive permanent serious impairment of vision from a high-altitude burst.

Ionizing-Radiation Effects

Acute Exposure. Table 1 on page 15 shows probable early effects of acute exposure to varying doses of ionizing radiation over the whole body.

Chronic Exposure. If exposure to radiation is not acute but is prolonged, some tissues of the body undergo repair and the degree of the biologic effect depends, among other things, upon the balance maintained between the continuing repair and radiation damage. For doses accumulated over a one or two-day period, the repair process is not very effective, but on and after the third day, particularly at low dose rates, appreciable differences occur. Tables in the report summarize applicable estimates made by the U. S. Public Health Service.

Table 1. PROBABLE EFFECTS IN HUMANS OF ACUTE EXPOSURE TO IONIZING RADIATION OVER THE WHOLE BODY*

Acute dose, r	Probable effect
0–25	No obvious injury
25–50	No serious injury; possible blood changes
50–100	Blood-cell changes; some injury; no disability
100–200	Injury; possible disability
200–400	Injury and disability certain; death possible
400	Fatal to 50 per cent
600 or more	Fatal

*Data from *Radiological Health Handbook*, U. S. Department of Health, Education and Welfare,[28] citing *The Effects of Nuclear Weapons*[24] as the source of the information.

Accumulative Genetic Effects. Long-term genetic effects attributable to exposure to ionizing radiation above the natural background are not clearly definable. However, responsible individuals have estimated that from 30 to 80 r accumulated dose would double mutations that occur spontaneously. In view of this, a Genetics Committee of the National Academy of Sciences has recommended that radiation exposure (1) be held as low as possible, (2) as an average for the population, be limited to not more than 10 r accumulated dose

Table 2. ESTIMATED CLINICAL COURSE AND HOSPITILIZATION REQUIREMENTS FOR HUMANS EXPOSED TO VARIOUS ACUTE DOSES OF PENETRATING RADIATION*

Dose, r	Individuals following indicated clinical symptoms, %						Individuals needing hospitilization, %	Maximal time of hospitilization, weeks
	Trivial	Light	Moderate	Serious	Grave	Fatal		
0–200	98	2					None	0
200–300	1	33	64	2			2	6
300–400			6	68	26		94	7
400–500				3	58	39	100	9
500–600					6	94	100	11
Above 600						100	100	11

*Compiled from Gerstner.[22,23]

to the reproductive organs up to the age of 30 years, and (3) be limited for individuals to 50 r to the reproductive organs up to age 30 and 50 r additional up to age 40.

Emergency Exposure. It is of interest to note the statement of a responsible body of scientists on considering the question of maximal permissible radiation exposure in case of an emergency: ". . . it can be stated with some confidence that total doses of 150 to 200 r, delivered acutely or over days or months, would result in no apparent acute effects and serious late effects in only a small percentage of those exposed."

Hospitalization. The percentage of exposed population that might require hospitalization and a very general assessment of the clinical course are noted in Table 2 on page 15.

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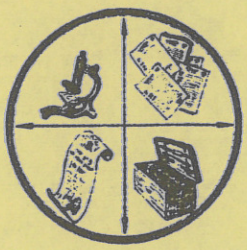

MISCELLANY

Precautions for Swimmers

With the summer season well under way, the Preventive Medicine Division, Bureau of Medicine and Surgery, stresses continued observation of the following swimming precautions:

Know and observe your own swimming limitations. Do not swim alone and do not swim when you are tired, overheated, or chilled.

Do not swim in water that is too cold; cold water exhausts a swimmer more quickly than warm water. Do not swim distances in cold water.

Do not become fatigued. Temporary relief may be obtained by varying the style of swimming or by floating.

Cold or tired muscles are susceptible to cramp. To overcome a leg cramp, draw your knees toward your chest, massage and move cramped feet or leg while floating.

Do not dive from floats, low platforms, and springboards into water that is less than 8 feet deep.

Avoid swimming in the dark.

Never jokingly call for help.

If trouble comes, keep calm, conserve energy, cooperate with those trying to help.

If going to give help, know your capacity for rescuing another swimmer. Try to reach the person by boat or, if near enough, hold something for him to grasp so that he can be pulled in. Swim only when other means of rescue are not possible; remove shoes and outer clothing before entering the water. Enter water feet first. Carry a stick, a shirt, a towel, or a rope for the distressed person to grasp. Approach from behind. If he attempts

to grab you, duck and push him away or turn him around.

Every organized bathing beach or swimming pool should be supervised by well trained men or women who can act intelligently and correctly in an emergency.

DO NOT TAKE CHANCES.

(Commonwealth of Virginia Department of Health, Bureau of Communicable Disease Control)

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Mobile Surgical Teams

Four of the ten mobile surgical teams, established by BUMED INSTRUCTION 6440. 1A and described in the Medical News Letter for 3 March 1961, have already completed their training. These four are located at San Diego and Oakland, Calif., Philadelphia, Pa., and Bethesda, Md.

Mobile surgical teams are designed to provide direct support to fleet and overseas operating forces by augmenting the personnel and material of pre-existing medical facilities when it is anticipated that the number of casualties requiring surgical care may exceed the capabilities of the medical support elements organic to the combat units or operating forces. They are also designed to provide surgical support and emergency treatment in disaster control measures within and outside the United States.

Surgical Team No. 3, formed at the Bethesda hospital, recently concluded a short course of field training and orientation with the 2nd Marine Division, Fleet Marine Force, Camp Lejeune, N. C. Major General J. P. Berkeley USMC, Commanding General, recently sent a letter to Rear Admiral E. C. Kenney, Surgeon General of the Navy, in regard to this training, which is quoted in part:

"Surgical Team No. 3 . . . has just concluded a short course of field training and orientation with this Division. The ingenuity, initiative, and enthusiasm demonstrated by this team were outstanding and deserving of highest praise. I realize that there must be many problems in uprooting a highly trained group of medical personnel from their familiar hospital environment, transporting them hundreds of miles and dropping them into completely foreign surroundings. Yet, this team's attitude and approach to the training were commended by those with whom they came in contact.

"Based on observation of this training exercise, I am confident that the surgical requirements of Marine Corps units in combat will be met with competence and efficiency."

Surgical Team No. 3 recommended, and the Bureau concurs, that it would be advantageous to have surgical teams familiarize themselves with certain films and books at their home hospitals prior to reporting for active duty:

Books and Manuals

Emergency War Surgery, NAVMED P-5059

Landing Force Manual, Medical Service, U.S. Marine Corps

Surgery in World War II, Medical Department, U.S. Army (particularly Vol II, General Surgery; and also

Orthopedic Surgery in the Mediterranean Theater of Operations.
Recent Advances in Medicine and Surgery, based on Professional Medical Experiences in Japan and Korea (published by Walter Reed Army Medical Center), Vol's I & II
Early Medical Management of Mass Casualties in Nuclear Warfare, NAVMED P-5046
Combat and Field Medicine Practice, NAVPERS 10819A

Films

Debridement of Wounds (Part I), PMF 5304, (Part II), PMF 5305
Resuscitation of Severely Wounded, TF-8-2918
Management of Mechanical Injuries in Mass Casualties, TF-8-2676
Cricothyroidotomy, MN-7469
Treatment of Thoracic Injuries, American Cyanamid Corporation, Distributor

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Special Training Courses

During subsequent months several special training courses will be available to certain qualified personnel. In view of the anticipated shortage of travel funds for fiscal year 1962, only a limited number of officers can be authorized to attend the courses on travel and per diem orders chargeable against BuMed funds. Eligible and interested officers who cannot be provided with travel orders to attend at Navy expense may be issued Authorization Orders by their Commanding Officers following confirmation by the Bureau of Medicine and Surgery that space is available in each case. Requests should be forwarded in each case, in accordance with BUMED INSTRUCTION 1520.8, to arrive in the Bureau by the indicated deadline date.

Chemical, Biological, and Radiological Weapons Orientation

Twenty-three classes in the Chemical, Biological, and Radiological Weapons Orientation Course will be conducted at the U. S. Army Chemical Corps Proving Ground, Dugway Proving Ground, Dugway, Utah, by the Department of the Army during the Fall of 1961, and Winter and Spring of 1962. The duration of the course will be 3-1/2 days.

Officers of commander through flag rank are eligible to attend. Civilians in the grade of GS-13 or higher must be in a key position where need-to-know is mandatory. Persons who have received complete CBR briefings during the past year should consider delaying their attendance. Security clearance of TOP SECRET is required. Limited quotas will be provided the Bureau of Medicine and Surgery by the Chief of Naval Personnel on a "first come, first served" basis.

The course provides a high level orientation on CBR subjects and is designed to acquaint senior military and civilian personnel of the Armed Forces with United States doctrine, policy, technics, and capabilities in CBR Warfare.

The scope of this course relates to national policy concerning CBR Warfare; U.S. present and potential, as well as foreign, capabilities for waging CBR Warfare; concepts, technics, target analysis, systems of employment, integrated weapons systems, operational applications, comparative logistics, strategic appraisal, joint aspects, covert activities, and future developments in Chemical and Biological Warfare; live firing demonstrations employing chemical agents against typical tactical target; staff responsibilities in radiologic fallout prediction, monitoring, survey, and radiologic recovery; and student-faculty panel.

Months during which courses are scheduled and deadline dates for receipt of application in Bureau of Medicine and Surgery are:

MONTHS OF COURSES	DEADLINE FOR REQUEST TO REACH BUMED
September 1961	17 July 1961
October 1961	7 August 1961
November 1961	11 September 1961
December 1961	16 October 1961
March 1962	8 January 1962
April 1962	5 February 1962
May 1962	12 March 1962
June 1962	9 April 1962

Nuclear Weapons Medical Symposium

Two sessions of this Medical Symposium will be conducted at the Field Command, Defense Atomic Support Agency, Sandia Base, Albuquerque, N. Mex., during fiscal year 1962.

TOP SECRET security clearance is required on all candidates approved for attendance; all requests must indicate that this clearance has been granted to the officer requesting attendance. Additionally, Department of Defense participants must be certified to the Atomic Energy Commission for access to Restricted Data by their respective organizations in accordance with appropriate Service regulations.

CLASS	INCLUSIVE DATES	DEADLINE DATE TO APPLY
NWMS-11	27 November - 1 December 1961	1 September 1961
NWMS-12	30 April - 4 May 1962	1 February 1962

Lectures in Aerospace Medicine

This course, to be held at the School of Aerospace Medicine, U.S. Air Force Aerospace Medical Center (ATC), Brooks AFB, Tex., 15-19 Jan 1962, will present late developments in research pertaining to aerospace medicine. Physicians and scientists concerned with problems of space medicine are eligible for the course. Applications should be received in the Bureau by 6 Nov 1961.

Naval Medical Research Reports

U.S. Naval Medical Research Unit No. 3, Cairo, Egypt

1. Insecticide Resistance in Egyptian Body Lice. MR 005.09-1402.8.04, May 1960.
2. Leptospirosis in Water Buffaloes and Occupational Individuals in Egypt. MR 005.09-1702.1.01, September 1960.
3. Migrating Birds and Their Ectoparasites in Relation to Disease. MR 005.09-1402.3.13, January 1961.
4. Evaluation of Therapy of Schistosomiasis in a Controlled Population. MR 005.12-1001.3.02, May 1961.

U.S. Naval Medical Field Research Laboratory, Marine Barracks, Camp Lejeune, N.C.

1. Snakebite in Eastern North Carolina. A Review of 121 Cases and Physician Survey. MR 005.09-0020.1.4 Subtask No. 1 Report No. 4, February 1961.
2. Detachment of Embedded Adult Amblyomma Americanum (L.) Ticks with Chemicals. MR 005.09-1407.1.1 Subtask No. 1 Report No. 1, February 1961.
3. The Influence of Tissue Preparation and Period of Drug Action on the Response of Isolated Mouse Ileal Segments to Acetylcholine Chloride. MR 005.06-0020 Subtask No. 1 Report No. 2, February 1961.
4. Influence of Instrumentation, Tissue Preparation, and Period of Drug Action on the Response of Isolated Rabbit Ileal Segments to Acetylcholine Chloride. MR 005.06-0020.1.3 Subtask No. 1 Report No. 3, February 1961.
5. The Influence of Tissue Preparation and Period of Drug Action on the Response of Isolated Guinea Pig Ileal Segments to Histamine Diphosphate. MR 005.06-0020.1.4, April 1961.
6. Effect of Simulated Tropical Climate on the Performance of Marine Corps Personnel Wearing an Integrated Body Armor-Load Carrying System (BALCS). MR 005.01-0030, May 1961.

U.S. Naval Air Development Center, Johnsville, Pa.

1. Comparison of Tracking Performance in the TV-2 Aircraft and the ACL Computer/AMAL Human Centrifuge Simulation of this Aircraft. MR 005.15-1003.1 Report No. 4, 7 November 1960.
2. Negative Complement Fixation Reaction for Presumptive Auto-Antibodies in Sera of Burned Rabbits. MR 005.13-8003.1 Report No. 7, 8 December 1960.
3. Cessation of Shivering Following Forebrain Lesions in Anesthetized Cats. MR 005.15-2002.1 Report No. 23, 31 December 1960.
4. Effect of Cobalt Polycythemia on the Acceleration Tolerance of the Rat. MR 005.15-0002.15 Report No. 2, 1 March 1961.
5. A Logarithmic Integrator for the Spackman-Stein-Moore Amino Acid Analyzer. MR 005.15-0002.7 Report No. 14, 14 March 1961.
6. A 3J-1 Spin Simulation Program on the Navy Human Centrifuge.

MR 005. 15-0005. 6 Report No. 9, 17 March 1961.
7. Gravity Problems in Manned Space Stations. MR 005. 15-0005. 6 Report No. 8, 29 March 1961.
8. A Displacement-Sensing Constant-Torque Response Lever Designed for Use in Satellites. MR 005. 15-0002. 16 Report No. 4, 3 April 1961.
9. A Method for the Computation of Aortic Distensibility in the Living Human Patient. MR 005. 13-8003. 1 Report No. 8, 3 April 1961.
10. Some Physiological Changes Observed in Human Subjects During Zero G Simulation by Immersion in Water up to Neck Level. MR 005. 15-0005. 7 Report No. 1, 10 April 1961.
11. Accuracy of Lever-Displacement Behavior of Rats Following Exposure to Positive Accelerations. MR 005. 15-0002. 16 Report No. 5, 19 April 1961.
12. Measurement of Bioclimatological Heat Exchange. MR 005. 15-2002. 1 Report No. 24, 19 April 1961.
13. The Effect of Acclimatization to Cold on the G Tolerance of Rats. MR 005. 15-0002. 3 Report No. 6, 9 June 1961.
14. The Effect of Ageing on the G-Tolerance of Rats. MR 005. 12-0002. 3 Report No. 5, 9 June 1961.
15. Electrical Analog Simulation of Temperature Regulation in Man. MR 005. 12-2002. 1 Report No. 25, 12 June 1961.

U. S. Naval Medical Research Laboratory, Submarine Base, New London, Conn.

1. The Use of a Standard Psychiatric Interview to Predict Motivation of Enlisted Man for the Submarine Service. MR 005. 12-2100. 2. 03, 23 November 1960.
2. Proposed Military Standard for Glass and Plastic Plano Lenses and Visors; Optical and Transmittance Specs. for. MR 005. 14-0100-1. 01 Report 61-2, 1 February 1961.
3. Report of Operation Deep Freeze '60 Dental Officer. MR 005. 12-5220-2. 05, 22 March 1961.
4. Lighting Survey of the USS BECUNA(319). MR 005. 14-1100-1. 08, 8 May 1961.
5. Noise Survey and Recommendations for USS SAILFISH (SS-572). Memorandum Report No. 61-5, 24 May 1961.

U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla.

1. Erythropoietic Stimulating Factor Production in Pubescent Mice after a Single Exposure to Hypoxia. MR 005. 06-0060 Subtask No. 1 Report No. 1, 20 September 1960.
2. Effects of Inhalation of 100 Percent Oxygen on Performance of a Task Involving Visual Auditory Conflict. MR 005. 13-1002 Subtask No. 11, Report No. 3, 5 October 1960.
3. Hypocapnia and Erythropoiesis. MR 005. 13-3100 Subtask No. 4, Report No. 2, 7 October 1960.
4. Factor Analysis of Cadet Peer Ratings. MR 005. 13-3003 Subtask No. 10 Report No. 5, 19 October 1960.

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From the Note Book

RADM Kenney Attends AMA. Rear Admiral E. C. Kenney, Surgeon General of the Navy, attended the annual meeting of the American Medical Association in New York City, 25-29 June 1961. Admiral Kenney, on 27 June, presented a paper, "Comments on Project Mercury." He also represented the Navy Medical Department as a member of the House of Delegates, AMA.

Management School Graduates. Three Medical Service Corps officers were among the 86 officers graduating from the 1961 class in Navy Management at the U. S. Naval Postgraduate School, Monterey, Calif., on 1 June 1961. The three officers were LCDRs Leslie H. Joslin MSC USN, Albert J. Schwab MSC USN, and Dexter J. Lacy MSC USN. LCDR Schwab graduated with top honors—the only student receiving an "A" in all subjects.

Steroids and Chronic Lymphocytic Leukemia. Because of transient desirable effects, increased number of circulating lymphocytes, and increased severity of infections, it was concluded that corticosteroids should not be used electively in patients with chronic lymphocytic leukemia except in the presence of hemolytic anemia, significant thrombocytopenia, or in the presence of advanced disease associated with bone marrow failure. (R. Shaw, et al, Blood, February 1961)

Griseofulvin Therapy in Tinea Capitis. Oral treatment of tinea capitis due to M. audouini or M. canis employing griseofulvin was studied in 58 patients. The drug proved uniformly effective achieving eradication of the fungous infection in all 58 cases; only 13 instances of minimal and temporary side effects were noted. (J. Alban, J Pediat, March 1961)

Hearing Impairment. Mass hearing tests suggest that 80% of the population of the U. S. has some sort of deficit in hearing in one ear or the other. Some of these have a handicap from the deficit. Estimates indicate that about 10% of the population has a hearing impairment severe enough that something prophylactic or therapeutic might be done about it. The authors reviewed 5000 patients of a medical center population and found that the percentage of deviation from normal hearing approached the estimated figure for the country in general. They concluded that investigation of the extent of hearing impairment in the population of the United States should be carried out. (E. Fowler Jr, and T. Fay Jr, Arch Otolaryng, March 1961)

Sympathectomy in Hypertension. Thoracolumbar sympathectomy has produced significant lasting reduction of blood pressure in about one-third of the patients with primary (essential) hypertension who have been operated on. However, in spite of the dramatic clinical improvement which has occasionally been observed, the over-all results as evaluated by carefully controlled long-term follow-up studies have been so disappointing that the operation has been almost completely superseded by antihypertensive drug therapy. (K. Evelyn, M Clin N Amer, March 1961)

DENTAL SECTION

Corrosion in Dental Amalgam Restorations

Joseph Rubinstein, 808 S. Wood St., Chicago 12, Ill. Illinois D J 29:817-819, December 1960; abstr in Dental Abstracts 6:335, June 1961.

The galvanic action which occurs in the mouth is accompanied by a chemical reaction which leads to a deterioration and loss of material—the phenomenon called corrosion. Of the varieties of corrosion, the type most frequently encountered is electrochemical corrosion, in which two reactions occur, one at the anode and one at the cathode. Anodic reactions are primarily oxidations and are accompanied by a destruction of the anode metal. The reactions at the cathode are based on reduction, which does not affect the cathode metal. In the corrosion process the electrons flow from the anode to the cathode.

When two different metals form a part of a galvanic cell—such as gold and amalgam in the mouth—the less noble of the two metals shows gradual destruction due to corrosion.

A single restoration in the mouth also can create corrosion. There are two explanations for this:

1. Small anodic and cathodic regions form in the metal as a result of inhomogeneities in the metal caused by impurities, additional phases, or variations in grain size.

2. A metal in contact with saliva of different compositions in various areas, or in contact with saliva and pulpal fluid, which are in contact with each other, will develop a small current. Corrosion is created because of differences in solute concentration, bacteria count, temperature, or degree of aeration.

Little corrosion is found in an amalgam made up of small particles, because of the homogeneous structure of the alloy. Corrosion occurs more frequently in hidden areas and places where deposits prevent access to oxygen. The fact that tarnish on amalgam fillings occurs more often in hidden areas than on self-cleansing surfaces can be traced to restriction of the oxygen supply to the interproximal spaces. Corrosion plays a part in the delayed expansion of amalgam containing zinc, which will occur if the amalgam is contaminated during trituration or condensation.

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Contact Glossitis from Autopolymerizing Resin Splint

LCDR Homer S. Samuels DC USN, U.S. Navy Dental Clinic, Navy 115, FPO, New York, N.Y. U.S. Armed Forces M J 11:1501-1504, December 1960; abstr in Dental Abstracts 6:358-360, June 1961.

A 25 year old patient was admitted to the U.S. Naval Hospital, St. Albans, N.Y., because of painful lesions on the gingiva and tongue. Four days before admission he had complained of pharyngitis, which subsided in two days. His temperature had ranged up to 101 F. Oxytetracycline therapy for two days had produced no improvement and he was referred to the hospital.

The midportion of the anterior dorsal third of the tongue was covered with multiple small, punched-out, yellow ulcers on an erythematous base. The alveolar gingiva in the area of the maxillary right central and lateral incisors was extremely inflamed. The posterior two thirds and lateral borders of the tongue and the remainder of the oral mucosa were uninvolved. A temporary splint of poly(methyl methacrylate) had been inserted in the region of the maxillary right lateral and left central incisors, replacing a missing right central incisor.

Because the lesions were confined to the portion of the mouth in proximity to the temporary splint when the mouth was closed and in function, it was assumed that a chemical allergy or burn had occurred. The splint was removed and the patient was placed on general supportive therapy with mouth rinses containing a hot isotonic sodium chloride solution. The splint was taped to the patient's chest as an initial patch test but this elicited no reaction.

By the following day, the patient experienced relief from the discomfort, and after 48 hours the oral condition showed dramatic improvement. Three days after admission the patient was asymptomatic, afebrile, and able to masticate a regular diet.

Later patch tests elicited no significant reaction of the skin or oral mucosa.

Although presumptive patch tests were negative and a reaction similar to the original glossitis could not be repeated in a test site in the patient's mouth, the location and distribution of the lesion strongly implicates the resinous material. Several factors may have been responsible. A likely factor is that of oral dehydration. The mouth may have been kept open and dry during preparation of the bridge abutment, so that the tongue was deprived of the diluting effect of the saliva and thus was more susceptible to irritants. Other variable factors are the ratio of monomer to polymer, total bulk of material used, and pH of the combined oral environment. The author assumes that the herpeticlike ulcers were caused either by the thermal heat of polymerization of the material in the temporary splint, or by an allergic response occurring under optimal conditions which could not be duplicated.

A heat-cured, fixed prosthesis, with full veneer crowns on gold copings, was inserted in the patient's mouth, and was well-tolerated.

Sodium Fluoride Tablets for Children

F. A. Arnold, Jr, et al, National Institute of Dental Research, Bethesda, Md. D Progress 1:8-12, October 1960; abstr in Dental Abstracts 6:368, June 1961.

Tablets containing 2.21 mg of sodium fluoride (1.0 mg of fluorine) were taken by 121 children whose parents were physicians, dentists or other professional employees of the U.S. Public Health Service. These children and parents were deemed capable of following instructions consistently and exactly. Most of the families lived in the Washington, D.C. area. Some of the children began receiving fluorine soon after birth; the majority began to use fluoride tablets before six years of age.

Home water supplies whose fluorine contents were unknown were analyzed before the fluoride tablet regimen was started. A three-month supply of tablets was given to each family and they were asked to request more when the original supply was nearly gone. Instructions for use of the tablets were:

Children 0 to 2 years old: Make up all water added to any formula and used for drinking purposes by dissolving one tablet in one quart of water.

Children 2 to 3 years old: Give one tablet every other day. This tablet may be taken directly with water, or dissolved in a glass of water, milk or fruit juice. To be certain the tablet is completely dissolved, place it in a glass with a tablespoon of water, crush and stir until it is completely dissolved. Milk, fruit juice or water may be added to make a full glass. Stir the liquid.

Children 3 to 10 years old: Give one tablet daily, as directed above for 2 to 3 year old children.

Exfoliated deciduous teeth were analyzed for fluorine content.

The mean numbers of def and DMF teeth of the 121 children who took the fluoride tablets every day for an average of two-thirds of their lives, were comparable to def and DMF data previously reported for children of similar ages who drank fluoridated water or water containing optimum quantities of natural fluorine.

The regimen did not result in dental fluorosis of cosmetic significance. The mean fluorine content of deciduous teeth of children taking the tablets was significantly higher than that of teeth of children in a nonfluorine area. The fluorine content of deciduous teeth increased slightly and proportionally with the length of time the sodium fluoride tablets were taken.

Although this study indicates that fluoride tablets seem to be an effective means of controlling caries, water fluoridation remains a more practical and dependable procedure in large population groups.

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Training for Dental Officers at Sea

Dental Officers at sea may keep abreast of new developments in dentistry by three principal means: by enrolling in the self-study extension courses developed by the staff of the U. S. Naval Dental School with assistance from the Home Study Department of the University of Chicago; by diligently reading current dental literature; and by attending short postgraduate courses and meetings of dental societies when the ship is in port.

Several extension courses were developed to provide dental officers at sea and in remote stations with a balanced professional, educational program.

Endodontics	NAVPERS 10407
Operative Dentistry	NAVPERS 10759
Oral Diagnosis	NAVPERS 10739
Oral Surgery	NAVPERS 10729
Prosthodontics	Part 1, Complete Dentures, NAVPERS 10763
Prosthodontics	Part 2, Partial Dentures, NAVPERS 10764

Applications for enrollment should be submitted on form NAVPERS 992, via official channels, to the Commanding Officer (Code 5), U. S. Naval Dental School, National Naval Medical Center, Bethesda 14, Md.

Current literature includes the Journal of the American Dental Association, the U. S. Navy Medical News Letter, and such other periodicals as are received in accordance with BUMED INSTRUCTION 6820. 1D. It also includes books in the department library. Information concerning professional texts is contained in BUMED INSTRUCTION 6820. 4F.

Dental officers in ships often are able to attend dental society meetings or short postgraduate courses while their ships are in port. All dental societies welcome guests who are members of the American Dental Association. The important factor is to learn if there will be a professional meeting or postgraduate course while the ship is in port. This can be done in two ways. The first is to call on, or phone, the senior Navy dental officer in the port area and get the information from him. The second way to learn of dental society meetings and postgraduate courses is to consult the announcements section of the latest issue of the Journal of the American Dental Association. The Dental Education portion of the News in Dentistry Section carries information on postgraduate courses in dentistry by states.

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Monitoring of the Dental X-Ray Machine

Mr. Herbert J. Worsham, Industrial Hygienist, U. S. Naval Air Station, Norfolk, Va., recently submitted the following item for the Quarterly Industrial Health Report:

The Dental X-ray machines in the Infirmary (Norfolk Naval Air Station)

are being monitored with film badges. The inherent time lag in the "Cutie Pie" (ionization chamber survey meter) does not permit accurate readings during the short exposure time—less than 0.5 seconds—that is required for an X-ray when using the new ultra-fast film. After considerable experimentation it has been determined that Armours Steamed Bone Meal, 3/8" thick, contained in a 2.5" x 2.5" plexiglass cell, placed one inch from the cone opening, which in turn is in contact with a fresh coconut, produces essentially the same scatter radiation as the human head when making average dental exposures. With this arrangement exposures of 4.0 seconds are made, which is ample time to permit the detection instrument to stabilize and obtain an accurate reading without subjecting personnel to exposure for the required time.

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Personnel and Professional Notes

In-Service Instructor's Manual. Page Change 1 to the Instructor's Manual In-Service Training for Advancement to DN, DT3, NAVMED P-5062, is being distributed by the Bureau of Medicine and Surgery to all ships and stations having dental personnel. Dental activities having a requirement for additional copies of this change should submit a request to BUMED Code 611.

NDC Philadelphia Exam Results. Of 14 who participated in the Navy-wide competitive examinations for advancement in rating conducted at the U.S. Naval Dental Clinic, Philadelphia, 13 passed the examination; only 2 will not be able to be advanced in rating due to quota limitations. These outstanding results are believed due to sincere participation in the In-Service Training Program of the Dental Clinic which is commanded by Capt W.A. Smith DC USN.

LTs Brown and Winstead Commended. The Commanding General, Marine Corps Recruit Depot, Parris Island, S.C., recently commended Lts C.E. Brown and J.L. Winstead DC USNR upon completion of their obligated active service. The commendation read in part: "During the entire two-year period of your military obligation you have performed all assigned duties with a fine spirit of cooperative loyalty. You have displayed exceptional energy, initiative, and judgment in your everyday practice of your profession of dentistry. Your adherence to the spirit of altruism has won for you the respect of your patients, your fellow dental officers, and other personnel of the Depot." Lt Brown served as Chairman of the Program Committee and Lt Winstead served as Treasurer of the Parris Island Dental Study Club.

N.Y. Dental Society. Capt R.G. Gerry DC USN, Chief of Dental Service, U.S. Naval Hospital, St. Albans, N.Y., presented a projected clinic, Total Extraction With Immediate Dentures, at the annual meeting of the Dental Society of the State of New York, held in Syracuse, New York.

RESERVE SECTION

THE BERRY PLAN

Armed Forces Physicians' Appointment and Residency Consideration Program (Part II)

IV. SUMMARY OF PROCEDURE

A. If you desire active duty immediately after internship or 1 year after internship:

1. Return a Statement of Preference (SD Form 249) by 15 September 1961.

2. One of the services will communicate with you regarding application for reserve commission; complete and return application to the sponsoring service by 1 December 1961.

3. Indicate on the application form the quarter of the year following internship in which you desire to be called to duty.

4. Accept a commission when it is tendered.

B. If you desire to complete residency training before call to active duty (Deferment for Residency Training):

1. Return a Statement of Preference (SD Form 249) by 15 September 1961. (Be sure to check 3c on the form and list one specialty)

2. One of the services will communicate with you regarding application for reserve commission; complete and return application to the sponsoring service by 1 December 1961.

a. If selected for deferment: (1) accept a commission when it is tendered; (2) you will be furnished a "Request for Deferment and Hospital Agreement" (SD Form 247); complete the form as instructed and return by 1 March 1962.

b. If not selected for deferment: (1) accept a commission when it is tendered if you desire to remain in the program. You will be brought to duty according to your preference as expressed in paragraph 4 of the Statement of Preference; (2) if you do not desire to remain in the program you may, of course, decline a commission when it is tendered. (You may withdraw from the program at any time before accepting a commission).

V. CORRESPONDENCE

A. Correspondence pertaining to the Department of Defense program in general, or to initial acceptance therein, will be addressed to Office Assistant Secretary of Defense (Manpower) ATTN: DASD(HEALTH & MEDICAL), the Pentagon, Washington 25, D.C.

B. All correspondence pertaining to commissioning, or matters arising

subsequent to commissioning, such as status of application for commission, date of call to active duty, or specific assignment, will be addressed to the Surgeon General of the Army, Navy, or Air Force, as appropriate, Washington 25, D. C.

C. Questions concerning individual liability for induction may be answered only by the Selective Service System; therefore, such questions should be addressed to your Selective Service local board.

Questions and Answers

Some of the questions most often asked concerning this program follow, with their answers:

Q. Will you change my sponsor to a different service at my request?

A. Only under exceptional circumstances, in which such a change is acceptable to both services involved. From 80 to 95% of the participants in preceding programs were given their first choice of service. Failure of the remainder to receive their first choice resulted from a disproportionate number of physicians listing one service, in which case it became necessary to refer some to their second or third choice in order to insure an equitable distribution of physicians to the military departments.

Q. I did not get my first choice of service. Must I accept this?
A. No. Participation in the program is voluntary. If you do not desire to participate you may, after 1 March 1962, apply directly to the service of your choice. Acceptance of your application will depend upon the requirements of the particular service at the time you apply. Possibilities may be limited because first preference is given to physicians who apply for the program before 15 September 1961.

Q. Is it possible to withdraw from the program?
A. Yes. Participants may withdraw at any time prior to accepting a commission. Under these circumstances you would retain your vulnerability to the draft.

Q. My school is on the quarter system and I will graduate in September (or December); am I eligible for this program?
A. The mailing list is made up from rosters furnished us in April 1961 by the Deans of medical schools. Physicians who will graduate in September or December 1961 may not be included in the list. Therefore, physicians who graduate in September or December of one year will be given the opportunity of participating with students who graduate the following year. Thus, physicians whose graduation date is September 1960, December 1960, March 1961, or June 1961, will be included in the 1961 program.

Q. I have decided I would like to make the service my career (accept a regular commission). Will you change my sponsor?
A. The assignment is not binding if you apply for a regular commission.

Q. I desire to accept a commission as a medical officer with the National Guard. Am I eligible for this

program?
A. No. However, under present Department of Defense policy, those accepting a commission as medical officers in the National Guard will not be subject to active-duty orders, except under emergency conditions, provided they fulfill all training requirements specified by the National Guard.

Q. I have a commission in a branch other than the Medical Corps (Medical Service Corps, Ensign 1915, Artillery, et cetera). Am I eligible for this program?
A. Yes, provided you transfer your commission to the Medical Corps. Request for transfer must be submitted to the sponsoring military department not later than 1 December 1961.

Q. I am a participant in the Senior Medical Student Program or Military Internship Program. Am I eligible to participate in this program?
A. No. Participants in programs sponsored by the military departments which require obligated service upon completion of internship are not eligible for this program.

Q. I desire to serve in the U. S. Public Health Service. Am I eligible to participate in this program?
A. No. Individuals who desire to fulfill their military obligation by serving with the U. S. Public Health Service should write to the Surgeon General, U. S. Public Health Service, Washington 25, D. C.

Q. How is the Department of Defense mailing list for distribution of information bulletins and forms compiled?
A. Each medical school gives the Department of Defense the names and addresses of internship of graduating medical students. The names of students who are participating in Armed Forces programs which require active duty following internship and students who desire to serve with the U. S. Public Health Service (two preceding items) are deleted. All others are mailed the information bulletin and application form (SD Form 249).

Q. How does the Commissioned Officer Residency Deferment (CORD) Program of the Public Health Service differ from the Berry Plan?
A. It is essentially the same. Individuals must apply for commission to the Public Health Service by 1 November for deferment beginning the following 1 July; they must qualify for a Public Health Service Reserve commission; Reserve commissions in other services are not transferable and therefore must be terminated prior to accepting a Reserve commission in the Public Health Service and vice versa. For further information regarding the CORD Program, write to the Surgeon General, U. S. Public Health Service, Washington 25, D. C.

Q. I have had no military service and my present draft classification is IV-F. Am I liable for military service?
A. Yes. Under existing law you remain liable until the age of 35. It is the policy of the Department of Defense that all physicians are considered potentially acceptable for military service, provided they can reasonably be expected to perform their duties in the Armed Forces. After referral to a military department, you may apply

for a commission and have a final determination made of your acceptability for military service.

Q. I did not apply for the Berry Plan prior to 15 September 1961. What is my status at this time?
A. You will be vulnerable for call-up under the Selective Service System in the event that a doctor draft proves to be necessary. A draft call will be placed with the Selective Service System if the services cannot obtain, through voluntary programs such as this one, enough physicians to staff their medical facilities and to provide high standards of medical care to the armed forces. Statement of Preference forms may be submitted after 15 September 1961; however, acceptance will depend upon whether vacancies exist at the time. Also, you may wait until 1 March 1962 and apply directly to the service of your choice to fill an active duty or deferment vacancy that may exist at that time.

Q. What rank will I be given if I apply for a commission now?
A. Physicians with less than 3 years professional experience after graduation from medical school may be appointed in the grade of first lieutenant in the Army or Air Force or lieutenant (junior grade) in the Navy. Under existing Department of Defense policy, medical officers (except interns) are promoted to the temporary grade of captain in the Army or Air Force, or lieutenant in the Navy, effective upon entry to active military service in the Armed Forces.

Q. What is the active duty pay and allowances for a captain (medical officer) in the Army or Air Force or Lieutenant in the Navy?
A. The pay is $665.48 with dependents, or $648.38 without dependents. Medical officers trained in aviation medicine or submarine medicine may receive extra pay while serving in an assignment involving flying or duty aboard submarines.

Q. If I accept a commission in the Armed Forces will I be subject to a draft call by Selective Service?
A. No. Draft calls are filled by Selective Service registrants classified 1-A. It is the announced policy of Selective Service to classify registrants who are members of the Reserve components of the Armed Forces I-D (members of Armed Forces Reserve).

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Military Symposium at American Podiatry Association Meeting

The 49th Annual Meeting of the American Podiatry Association will be held at Miami Beach, Fla., 24 - 29 August 1961. A military symposium will be held in conjunction with the meeting.

Eligible inactive Naval Reserve Medical Department officers may earn one retirement point credit for attendance at each section provided they register with the military representative present.

OCCUPATIONAL MEDICINE

Hazards in Use of Isopolyesters as Maintenance Coatings

R. W. Stephenson PhD and L. B. Fosdick MS, Oronite Chemical Company, San Francisco, Calif., and Argonne National Laboratory, Argonne, Ill.
Ind Hyg J 21:522-525, December 1960.

Some time ago a test program was initiated at the Richmond Refinery of Standard Oil Company of California, Western Operations, Inc., to investigate the use of unsaturated polyesters in maintenance applications.

There were several factors calling for establishment of the program. The principal factor was the rising cost of maintenance and need for better materials and methods to combat corrosion. A second motivating factor was development of unsaturated polyesters based on Oronite Chemical Company's isophthalic acid. These polyesters—commonly known as isopolyesters—demonstrated outstanding characteristics. Among these were good adhesion to various substrates and good chemical resistance. By varying the formulation of the isopolyester, one could obtain flexible resins with excellent impact properties, or rigid resins with outstanding high temperature properties and good chemical resistance.

Large scale testing of isopolyesters thus far has been in patching compounds, in construction of laminates, and in surface coatings.

Since this large scale test program involves a problem of industrial hygiene, we are presenting here the background information and operating practices followed in these tests to permit safe usage of isopolyesters.

Improper use of unsaturated polyesters can involve inhalation hazards, skin and eye hazards, and danger of fire. Our purpose, therefore, is to point out these potential hazards from toxicity and fire and the precautionary measures necessary for safe usage.

Resin Make-up

Polyester resins for patching and coating operations usually are received in styrene solutions. Sometimes, additional styrene is added at the job site to further dissolve the resin and to facilitate mixing and application. In setting (polymerization), the styrene combines chemically with the resin to form the final plastic product.

Setting is accelerated by addition of cure catalysts such as methylethylketone

peroxide or benzoyl peroxide. In addition, cobalt naphthenate or dimethylaniline may be added as "promoters" to facilitate setting at room temperature. The mixed resin can be sprayed or applied by brush.

Toxicity Hazards

Inhalation. During polyester resin application, vapors of styrene can cause concern. The odor may be pronounced and atmospheric concentrations developed during spraying and brushing applications can cause a sweet taste in the worker's mouth and a strong odor of styrene on his breath for several hours after the operation. More severe exposures can cause symptoms of nausea, vomiting, loss of appetite, and general weakness. In laboratory animals exposed to high concentrations of styrene vapor, death has resulted from lung irritation or central nervous system depression. In general, however, the disagreeable odor of styrene at relatively low vapor concentrations, and eye and nose irritation at higher concentrations, make inhalation of seriously toxic quantities unlikely unless the victim is trapped in such location that escape from the vapor is impossible. Relating styrene to other common solvents, it is roughly of the same order of toxicity as xylene, and the main concern is with acute poisoning. Styrene apparently does not cause chronic poisoning as does benzene in its cumulative effects upon the blood.

The maximum allowable concentration (MAC) for styrene based on daily eight-hour exposure has been set at 100 parts of styrene vapor per million parts of air (ppm) by volume, primarily on the basis of irritant properties. Atmospheric concentrations of styrene measured during polyester resin operations have been recorded at between 200 and 700 ppm in a large room. These levels undoubtedly would run higher in closed areas, and particularly inside tanks and vessels.

During measurements, the highest concentrations of styrene vapor were recorded during initial mixing of the resin and catalyst. The next to highest concentrations were recorded during application of the plastic, and from then on concentrations decreased as the plastic approached complete cure.

If ventilation cannot be applied to the particular polyester resin operation to maintain breathing zone levels of styrene below 200 ppm, personal respiratory protection must be provided. In confined areas known to contain less than 20,000 ppm (2%) of styrene and at least 16% oxygen, a canister gas mask for styrene will suffice. Where the concentration is unknown but estimated to be high, or where the oxygen content may be below 16%, a self-contained breathing apparatus or an air-line mask, should be used. Respirators are not satisfactory for other than relatively low concentrations because of the irritating effect of higher concentrations of styrene on the eyes.

Skin Contact. Styrene also tends to defat the skin, resulting in inflammation and cracking of exposed areas. The condition often is aggravated by the practice of using acetone to clean plastic from the skin. In order to prevent dermatologic effects, employees exposed routinely to such contact should be provided with gloves and aprons made of neoprene or nonsoluble

plastic. Polyethylene gloves have been used with good experience. In operations in which use of protective gloves would hinder work, protective barrier cream should be used. The cream should be rubbed well into the skin until dry, covering all exposed surfaces. The eyes should always be protected from styrene liquid and vapor by chemical-type safety goggles and/or face shield.

During initial make-up of the resin prior to application, great care should be taken with those mixtures involving addition of dimethylaniline promoter. Potentially, this addition could involve exposure to both the liquid and the vapor. Dimethylaniline acts as a strong depressant on the central nervous system. Sonce it is readily absorbed through the skin, even small splashes on the skin, shoes, or clothing should be promptly removed. Peroxide catalysts and cobalt naphthenate also may be injurious upon repeated or prolonged contact with the skin and should be washed off promptly. Protective clothing, including an impervious apron, chemical safety goggles, and an approved respirator are advisable during mixing. The operation should be carried out in a well-ventilated area.

Fire Hazard

Precautions should be taken to prevent contact of plastic raw materials with combustible organic substances in order to guard against spontaneous combustion. Methylethylketone peroxide is a strong oxidizing agent and therefore, should be stored carefully to prevent contact with such organic materials. Store in a cool place if possible and carefully note the precautions on the label.

As the plastic polymerizes it can reach temperatures of 400 F, especially when cobalt naphthenate is added. To prevent spontaneous combustion, wiping cloths should be disposed of in covered metal containers. Such containers can have plastic liners for easy removal and disposal. All excess plastic from squeegee operations should be taken outside as soon as the plastic application is completed. Good housekeeping is imperative to guard against fires; a final check should be made after every job to determine that all wiping cloth containers and excess plastic constituents are removed from the building or area and disposed of promptly.

Styrene vapor concentrations in the range of 1.6 to 6.1% (by volume) are flammable. Therefore, in confined or nonventilated areas where such concentrations may be formed, sources of ignition from friction, static charge, hot spots, et cetera, should be guarded against until the resin has cured and the air has cleared. When the resin is applied by spray gun, the gun head and resin container should be grounded to the metal surface being coated. Similarly, in the initial mixing it is good practice to keep containers in metallic contact when pouring from one to another.

Mixtures of either pure cobalt naphthenate promoter and a peroxide cure catalyst, or of dimethylaniline promoter with a peroxide catalyst, will decompose rapidly and possibly ignite. If premixing in one container is necessary—as may be the case prior to brush application—the cobalt naphthenate or dimethylaniline cure

promoter should be thoroughly mixed with the polyester resin before adding the peroxide cure catalyst.

Summary

Mixing and use of polyester resins can involve exposure to toxic chemicals through inhalation and skin and eye contact. Fire hazards may also be present. Though the hazards will vary with the specific methods of use, some general suggestions apply.

Mixing of Resin and Catalysts:

1. Conduct mixing in a well-ventilated area.
2. Add the "promoters" cobalt naphthenate or dimethylaniline to the polyester resin and thoroughly mix before adding the peroxide cure catalysts.
3. Observe special care when using dimethylaniline. To prevent exposure, use an impervious apron, chemical safety goggles, and an approved respirator if the vapors are not controlled. Promptly remove even small splashes of dimethylaniline on skin, shoes, or other clothing.
4. Take proper precautions in storing plastic raw materials to prevent spontaneous combustion. Avoid contact of the oxidizing agents and the plastic with any combustible matter.
5. For styrene, containers should be kept in metallic contact when pouring from one to another.

Polyester Resin Application:

1. Prevent excessive skin contact. Use a neoprene apron and either gloves or a protective barrier cream on hands.
2. Prevent excessive inhalation of the vapors through:
   a. effective ventilation of the area.
   b. personal respiratory protection:
   (1) respirators are effective only for relatively low concentrations—not suitable in enclosed areas.
   (2) in confined areas with sufficient oxygen (over 16%) and less than 20,000 ppm styrene (2%) a canister gas mask approved for styrene can be used.
   (3) in confined areas with unknown oxygen and estimated high styrene content, a self-contained air-supplied mask or an air-line mask should be used.
3. Prevent eye contact. Use chemical-type safety goggles and/or face shield.
4. Maintain good housekeeping to guard against fires. Dispose of wiping cloths and excess uncured plastic constituents. Prevent all contact of plastic materials with combustible materials.
5. Prevent possible fires. Keep containers in metallic contact when pouring from one to another. Prevent hot spots, friction, and static charges when using resins in confined areas where styrene vapor could form flammable mixtures. When spraying, ground the gun to the resin container and to the metal surface being sprayed.

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The Pregnant Woman in Industry

Report from the State of Illinois Department of Public Health, The Pregnant Woman in Industry. Ind Med & Surg 30:238-240, June 1961.

The need for protection of employed women in the United States has taken on additional significance with the increasing proportion of married women in the labor force. More than one-half of the gainfully employed women are married. With the high marriage rate prevailing at the present time, the birth rate may be expected to continue at a high level for years. Therefore, problems relating to employment of pregnant women and a program of maternity benefits will be of concern to employees, employers, the medical profession, and health and welfare organizations interested in the health of employed women.

According to the somewhat startling information published by the United States Department of Labor, Women's Bureau, it is estimated that by the end of the coming decade the number of women workers in the nation will increase by as much as 25%. In round numbers, this means there will be about 30 million women workers—six million more than in 1960.

Increased employment of women presents a two-fold problem having to do not only with the effect of industrial work on the woman, but the effect of pregnancy on the capacity of the woman to remain employed. It is to be expected, therefore, that one of the first questions in this area an employer will ask is, "How can the pregnant woman continue to be employed with efficiency and without risk to her health and that of her unborn child?" The question which is frequently coupled with the first is, "How long may a pregnant woman be expected to continue to work safely?"

The policy of dismissal of women workers as soon as they are known to be pregnant, or shortly afterwards, has resulted in concealment of pregnancy for as long as possible by a substantial number of pregnant women. The results of continued employment of pregnant women without adequate health supervision can be serious for both employees and employers.

It appears that a reasonable approach to the problem is a sound "maternity policy" that will encourage women to seek prenatal care early in pregnancy, and to report a state of pregnancy early, with the understanding that their employment will be continued, based upon health factors. Such a policy would prevent pregnant women workers from being penalized economically for being pregnant, and would make continued employment dependent upon their health and welfare rather than on an ill-founded arbitrary rule requiring prompt removal from their jobs.

When a "maternity policy" is established by the employer, all women should be informed about it in detail at the time of their employment. A printed copy of the plan, giving specific instructions for procedure in the event of a pregnancy, should be distributed to the new employee by the nurse or personnel director. Another suggestion for establishing and maintaining cooperation in a program concerning pregnancy would be use of a payroll insert card that could be

designed to inform all employees about the maternity plan for employed women.

The plant physician and nurse, or employer, should refer pregnant employees to their family physicians for medical care. If the employee is unable to pay for private medical care, she may be directed to one of the community clinic services. The kind of work performed by the employee should be fully explained to the family physician or clinic service so that they may determine whether the employee may continue to work at her present occupation and at what period in her pregnancy she should stop working.

As soon as the nurse knows an employee is pregnant, plans can be made for regular interviews. Pregnant employees usually are not seen by the plant physician unless he is called on to evaluate a work-connected situation that might have an adverse effect on the woman's condition.

Such a health plan can be successful and beneficial only if both management and the employees recognize that certain responsibilities and obligations are incumbent on both sides. Much of the success of this health program will be through cooperation of the family physicians or obstetricians in the community. These physicians must become informed about employment, industrial demands, and regulations pertinent to them so that they can advise the pregnant employee fairly and accurately. Maternity problems of commerce and industry are an integral part of the maternity problems of society as a whole and deserve the combined interest of all persons concerned.

There have been repeated requests for a statement of policy or a reliable guide for employers who may have the safety and well-being of pregnant women to consider. The following suggested policies, prepared by the Department of Public Health, State of Illinois, may be used as a guide to employers in all 50 states.

Suggested Policies for Pregnant Women at Their Places of Employment

Medical Statement and Periodic Reports. Upon diagnosis of pregnancy, the employee should present a written statement from her physician to the plant health service, or to the personnel director if there is no plant physician or nurse, which indicates the expected date of delivery and specific limitations for her work.

In the interest of the employer, as well as the employee, periodic reports from the employee's physician regarding her state of health should be obtained. The frequency of periodic reports is a policy to be worked out between the employer and the employee's physician. These reports will serve two purposes:

1. They will reveal that she is receiving regular medical supervision.
2. They will advise the employer if she should continue in her present job, be transferred to a less hazardous one, or her employment be discontinued.

Continued Employment. Normally, the pregnant woman may continue in her employment, being transferred to lighter or more sedentary type of job, if necessary. The work should meet these requirements:

1. Pregnant women should not be employed between 12 midnight and 6 a. m. They should not work more than 8 hours a day and preferably

not more than 40 hours per week.

2. Every pregnant woman should have at least two 10 minute rest periods during her work shift, properly spaced to avoid fatigue, and with precautions taken to avoid situations that create a hazard, such as crowding at lunch time and quitting time. There should be adequate facilities for resting and opportunity to secure nourishing food.

3. Pregnant women should not be employed in the following types of work, but should be assigned to non-hazardous jobs:

a. Jobs that require strain of muscles or joints, such as heavy lifting, stretching, continuous standing, prolonged sitting, stooping or walking, stair climbing many times a day or when carrying materials where the hands are not free for holding to railing.

b. Jobs that require good sense of bodily balance, such as work on scaffolds or stepladders.

c. Jobs in which there is marked vibration as well as danger of severe injury, such as near power presses, power-driven woodworking machines, or polishing machines.

d. Jobs involving exposure to lead and mercury compounds, aniline, benzol and toluol, nitrobenzol and other nitre compounds, carbon tetrachloride, ionizing radiation, and other toxic substances considered to be extra hazardous during pregnancy.

Leave of Absence.

1. Eight weeks' leave before the expected date of confinement is generally considered minimum (optimum 12 weeks or more). At any time during pregnancy, a reasonable amount of additional leave should be granted on presentation of a certificate or signed statement from the attending physician stating that complications of pregnancy make continuance of her employment prejudicial to her health or to the health of her unborn child. More time may be needed in the presence of prenatal complications (medical, surgical, or obstetrical).

2. After normal delivery, an extension of at least 6 weeks or more should be granted, unless the mother has no child for which to care, in which case 6 weeks may be sufficient. Additional leave should be granted for medical reasons when requested by the attending physician, up to a total of one year or in accordance with established plant policy in regard to leave of absence due to illness. This includes leave before and after delivery. Maternity leave, itself, should not be classified as "sickness disability."

3. Any woman employee absent from work on maternity leave should continue to accumulate seniority during the first 4 months of her absence, and thereafter should retain her full seniority until the expiration of the year, or in conformity with plant policy.

Flexibility in arrangements for extension of leave after delivery is highly desirable. In the interest of protecting the health and well-being of the mother, her newborn infant, and her family, sufficient leave should be granted to allow ample opportunity for the mother and a medical advisor to determine and provide the essentials to meet her requisites and that of her family while she is absent from home. When available, a social worker or counselor could be called upon to be of assistance to the family.

Surgical Removal of Foreign Bodies

In the Questions section of the Journal of Occupational Medicine for March 1961, appeared the following answer to the question: What are the indications for surgical removal of foreign bodies, giving consideration to various substances in different locations?

Without exception, nonmetallic foreign bodies such as wood, plastics, dust, clothing, dirt, grease, oil, and the like should all be removed promptly, since, in contradistinction to metallic and glass foreign bodies, these organic materials will cause local tissue reaction, cellulitis, and lymphangitis.

Glass foreign body particles present a slightly different problem. If there is a large glass fragment present as a foreign body, it should be removed. If the glass contains sufficient lead, it may be possible to visualize the particle on roentgenograms. This will permit accurate localization and accurate surgical approach to the particle. If, however, the glass fragment is a small one and is located in a nonfunctional area of tissue, it should be allowed to remain undisturbed. Discretion is certainly the better part of valor in deciding whether or not to attempt to locate and remove tiny glass particles in the tissues, since their removal may present an impossible technical problem. Very often a secondary foreign body reaction with localization of a small foreign body abscess or pustule immediately beneath the skin will render delayed removal of a tiny glass splinter or fragment much simpler from the technical standpoint.

Location of the foreign body, whether glass or metal, in a particular site is an indication for immediate surgical action: (1) All foreign bodies which by their location may be presumed to have penetrated a body cavity or a viscus in their course through the tissues should have immediate surgical exploration of the tract created by the foreign body from its point of ingress to its point of egress or lodgment in the tissues. (2) Aspirated foreign bodies in the respiratory passages demand immediate removal. (3) Foreign bodies should be removed from the eye as soon as possible.

Certain other locations of foreign bodies, particularly metallic foreign bodies, are indications for surgical removal; but in such cases the procedure is not an emergency. Surgery should be performed as an elective procedure with an accurate plan. These foreign body locations are (1) over a bony prominence just beneath the skin; (2) over or adjacent to moving joints, as, for example, finger joints, olecranon surface of the elbow, the patellas, the toes, the malleoli of the ankle; (3) on weight-bearing surfaces, such as the plantar surface of the foot or the gluteal area if the foreign body is of sufficient size; (4) proximity to or impingement upon a major arterial trunk; (5) impingement upon a peripheral sensory nerve trunk; (6) tissues of the face. While foreign body in the face may not cause impairment of function, the patient's continuous awareness of its presence and his concern about the cosmetic effect will dictate removal if this can be accomplished with minimum scarring or with reduction of the cosmetic defect.

Foreign bodies in certain locations

usually require no therapeutic action. (1) Those located in the extremities, except for those on weight-bearing surfaces, at moving joints or impinging upon major arterial or nerve trunks, need not be removed. (2) Ingested foreign bodies usually will pass through the intestinal tract and are recoverable from the patient's stool if careful observation is maintained. Removal by endoscopic manipulation or operative approach is indicated when roentgenograms show no progress of the foreign body along the intestinal tract or if signs of bowel or peritoneal irritation develop.

In general, then, organic foreign bodies require immediate removal, whereas nonorganic foreign bodies do not represent an emergency surgical problem and can usually be evaluated and dealt with on an elective basis with an accurately planned surgical approach.

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